3.12 Health and Safety

3.12.1 Sources of Information

Information on the location of the existing natural gas pipeline and the transmission lines was obtained through existing mapping and field surveys.

Information on electric and magnetic fields (EMF) and electric shock impacts was obtained from the Resource Contingency Program – Washington Final Environmental Impact Statement, Satsop Combustion Turbine Unit 1, Chehalis Generation Facility, published by Bonneville Power Administration, November 1995; from Black & Veatch; and from recent articles published on EMF.

3.12.2 Existing Conditions

The S2GF would be constructed on a vacant 37-acre site located within an industrial zone in the City of Sumas. Although no known contamination exists on the site, completion of a Phase I environmental assessment is recommended prior to any onsite ground-disturbing activities.

The proposed natural gas pipeline would be routed in an existing ROW parallel to an existing 8-inch-diameter, 4.5-mile natural gas pipeline that provides natural gas to the SCCLP cogeneration plant.

Potable/process water supply pipelines and process/domestic wastewater collection pipelines would be extended to the S2GF from the City of Sumas along road and utility ROWs.

The proposed 230 kV electrical transmission line to the Canadian border would be routed mostly along an existing railroad ROW.

3.12.3 Environmental Impacts of Proposed Action

3.12.3.1 Construction

Generation Facility

Hazardous material use during construction of the S2GF would be primarily limited to chemical cleaning of the Heat Recovery Steam Generator (HRSG) and process piping before being placed in service. This work is performed by a specialized contractor qualified to handle the materials. The contractor would be responsible for providing, using, and properly disposing of chemicals. A contractor has not been selected at this time so the specific chemicals to be used are not known. The following is a list of typical chemicals that are used during the chemical cleaning of the HRSG and piping:

- Aqueous ammonia
- Surfactant
- Corrosion inhibitors
- Citric or other similar acid
- Sodium nitrate
- Ammonium bicarbonate
- Anti foam agent

In addition, hazardous liquids whose use could generate solid or hazardous waste during construction include diesel fuel and gasoline, lubricants, cleaning solvents, paint, and paint residues. Also, hazardous solid waste materials could be generated by these fluids during a spill and the subsequent cleanup. Other hazardous wastes that would likely be generated include used oil, spent antifreeze, unused adhesives, discarded water treatment chemicals and residuals, and spent lead acid batteries. Non-hazardous solid waste associated with construction activities could include empty containers, scrap wood, scrap metals, and trash.

All solid and hazardous wastes produced during construction would be managed in accordance with applicable federal, state, and local laws and regulations. This would include transfer of wastes to appropriate facilities for recycling, treatment, processing, or disposal.

A stormwater pollution prevention plan would be developed to address the construction activities and handling of hazardous substances associated with the construction of the generation plant, as well as the gas, water, and wastewater pipelines and the transmission lines. The plan would address structural controls (silt fences, straw bale barriers, etc.), vegetation practices (temporary and permanent cover), and site management of solid/liquid/hazardous wastes.

The risk of a significant fire or explosion during construction of the facility is considered to be low. During construction small quantities of flammable liquids and compressed gases would be stored and used. Liquids used include construction equipment fuels, paints, and cleaning solvents. Compressed gases used include acetylene, oxygen, helium, hydrogen, and argon for welding. The potential hazards associated with these materials would be mitigated by following construction safety requirements found in Chapter 296-155 WAC and 29 CFR 1926 (OSHA).

Natural Gas Pipeline

In general, the pipeline construction process includes the following steps. First the permanent and construction ROW is cleared and topsoil is pushed to one side of the ROW. As the trench is excavated, the pipeline would be constructed in sections at the edge of the trench. After the welds are X-rayed, the pipe would be lowered into the trench using a series of side booms. There are tie-in welds made in the trench that are

X-rayed in the trench. Once the pipe is placed and the trench is backfilled with soil, the pipe would be pressure tested with water. Onsite inspectors representing the owner would be present during construction to verify that the contractor is following all engineering specifications and meeting all regulatory requirements.

The risks of fire or explosion during construction of a pipeline are minimal. Soils excavation, welding the steel pipe, and backfilling are the primary tasks required. The construction of the proposed gas pipeline presents a slightly higher risk than normal in this case because of the proximity to an existing gas pipeline. If the existing pipeline were damaged during construction, natural gas might be released. The high pressure involved would be likely to cause an explosion and fire. Being lighter than air, the natural gas would disperse over a wide area. Evidence of a gas leak would be readily apparent because the gas in the pipeline has an odor. However, if a source of ignition were also present, a natural gas release could result in a fire or explosion.

The following safety procedures are followed during construction:

- Construction would be performed by a qualified and experienced pipeline construction contractor.

- Prior to construction, the existing natural gas pipeline would be located and staked. It would be physically located every 1,000 feet and at intersections of other pipes and crossings. This would confirm the location and depth to ensure new construction does not affect the existing line.

- A minimum clearance space (buffer zone) of 10 feet would be maintained between the existing and new pipe.

- Construction methods and safety procedures would be established to avoid striking or damaging the existing pipe in any way.

- Heavy equipment would not normally be operating over the existing pipeline during construction of the new line. If heavy equipment or trucks must cross the existing natural gas pipeline, they would cross at right angles and the ground would be bridged with mats or additional soil cover to protect the existing pipe.

- Inspectors would be onsite during construction to verify that the contractor is following all safety procedures.

The use of these mitigation methods should reduce the risk of fire or explosion during construction. Additional safeguards regarding the design, construction, operation, and maintenance of the gas pipeline have been set forth in a partial settlement agreement between Washington Utilities and Transportation Commission and SE2 concerning natural gas pipeline issues (see Appendix G).

Radiation would be used in the field to test pipeline welds radiographically. The testing and controlled use of radiation would be performed in accordance with state and federal regulations and industry standards by a certified testing laboratory using qualified personnel.

During construction, the pipeline trench would be covered or secured with construction barriers after work hours to deter persons or livestock from entering the active construction area.

3.12.3.2 Operation

Generation Facility

Operation of the S2GF would require the use of natural gas, distillate fuel oil, and ammonia for emission control. The natural gas would be piped directly to the user, with no onsite storage. Backup fuel oil would be stored in a diked 2,500,000-gallon storage tank resting on an impervious liner. The emergency diesel generator fuel would be stored in a 1,000-gallon above-ground double-walled tank. Smaller quantities of lubricating oils would be contained in the three turbine generator lubrication oil reservoirs and systems. Ammonia would be stored and used in an ammonia system that meets code requirements.

Operation of the S2GF would not produce any spent fuel wastes such as ash. A very small amount of sludge would be formed in the cooling tower, but is not expected to be designated as a dangerous waste under state regulations. It is expected that this waste would be disposed of in a landfill.

Toxic and hazardous materials used during operation of the project would be handled, stored, and disposed of in accordance with applicable state and federal regulations as described below, and would not result in a threat to public health and safety. A Hazardous Materials Management Plan would be prepared for the facility to meet the local Fire Marshall's requirements and other applicable regulations.

Small amounts of hazardous wastes would be generated by the facility, such as used paints, thinners, solvents, and vehicle/equipment lubricating oils. These wastes would be managed to ensure compliance with the Washington State Dangerous Waste Regulations (Chapter 173-303 WAC). It is expected that the hazardous wastes produced would include primarily solvents and paint wastes generated during maintenance activities. A generator number has not as yet been assigned.

Title III of the Superfund Amendments and Reauthorization Act (SARA Title III) and the Occupational Safety and Health Administration's Hazard Communications Standard mandate communication of information to local agencies to assist in response to emergency situations. Material Safety Data Sheets (MSDS) that provide specified information on each toxic or hazardous material stored and used onsite would be maintained on file. A listing of MSDSs would be provided to local emergency response agencies. The MSDS describes the potential health effects of a given substance under different types of exposure and appropriate safety and treatment measures. S2GF would provide an annual inventory of the toxic and hazardous materials used onsite in accordance with industry standard (Tier 2) reporting requirements.

If any substance listed in 40 CFR 302 is released to the environment during the operation of the facility, S2GF would notify EFSEC, the National Response Center, U.S. EPA, and the Washington Department of Ecology as required under Section 101(14) of the Comprehensive Environmental Response Compensation Liability Act (CERCLA) and the Washington State Model Toxics Control Act (MTCA, Chapter 70.105D RCW), and implementing regulations (Chapter 173-340 WAC). In the event of a release, wastes would be handled in accordance with applicable regulations, including Chapter 173-303 WAC.

A representative list of applicable codes and regulations is presented in Appendix B of the ASC (Sumas Energy 2 et al. 2000). Based on the timing of construction, the most current versions of the applicable codes and regulations would be followed.

The combustion turbine generator units would be equipped with a specialized fire detection and protection system. Gas detectors will alarm when combustible gas in the combustion turbine unit enclosures reaches 25 percent of the Lower Explosive Limit (LEL). If combustible gas concentration increases to 60 percent of LEL, the gas detectors will shut down the combustion turbine and close the gas supply trip valve to the unit. The vent fans in the turbine enclosure would help to clear the combustible gas out of the enclosure. Thermal fire detectors and smoke detectors are located throughout the combustion turbine generator enclosure. Excessive heat or smoke would trip the detectors which in turn release a fire-smothering gas or a dry fire extinguisher.

The 2,500,000-gallon backup fuel oil storage tank[1] would be provided with a foam chamber, piping valves and nozzles for connection to a portable foam system or truck.

The lubrication oil system reservoirs would be equipped with fire detectors and a water deluge system that would be initiated automatically.

The diesel generator building would be equipped with fire detectors and an automatically operated deluge system.

The ammonia storage facility would be equipped with ammonia leakage detectors and an automatically initiated water deluge system to cool the ammonia storage tank. The entire ammonia system would be designed and built to comply with the most current ammonia system codes.

Water for fire control would be stored in a tank onsite. A jockey pump would keep the onsite system of hydrants and deluge systems pressurized. Upon operation of a deluge system or opening of a fire hydrant, the fire pumps would automatically provide water for

1 In its final briefing to the Energy Facility Site Evaluation Council (September 5, 2000) the applicant proposed to reduce the diesel storage tank size to 1.5 million gallons. The environmental impact of this proposed design modification has not been analyzed in this FEIS.

response to fires as required. The public services and utilities section of this EIS (Section 3.8) describes the adequacy of the fire fighting resources in the area.

The facility would be operated by qualified personnel using written procedures. Procedures would provide clear instructions for safely conducting activities involved in the initial startup, normal operations, temporary operations, normal shutdowns, emergency shutdowns and subsequent startups. The procedures for emergency shutdowns would include the conditions under which emergency shutdowns are required and the assignment of shutdown responsibilities to qualified operators to ensure that shutdowns are accomplished in a safe and timely manner. The procedures would also address the consequences of operational deviations and the steps required to correct or avoid such deviations.

An Emergency Response Plan would be prepared for the S2GF to ensure employee safety from the following emergencies: onsite chemical release, flood, medical emergency, major power loss, fire, extreme weather, earthquake, volcano, and bomb threat. The plan would be established prior to completion of construction. The plan would follow requirements of WAC 296-24-567 and 296-62-3112 and CFR 1910.38, Emergency Action Plan. All hourly and salaried employees, including administrative staff, as well as contractors and visitors would be covered by the plan.

Prior to commencement of operations, employees would be trained on the facility's Health and Safety Plan and Emergency Response Plan. They would also receive training regarding the operating procedures and other requirements for safe operation of the plant. In addition, employees would receive annual refresher training, which would include a test of their understanding of the procedures. Training and testing records would be maintained per OSHA and WSDOT standards.

The types of chemicals and hazardous materials to be used and stored onsite during operation are listed in Table 2-1 in Chapter 2. Engineered safeguards would be in place during time of operation to minimize the potential for discharge of any hazardous material to the environment. Licensed contractors would be responsible for transporting, treating, and/or disposing of the waste generated onsite in accordance with applicable federal, state, and local requirements. Asbestos or materials containing polychlorinated biphenyls (PCBs) would not be used in the construction or operation of the facility.

Potential health related impacts of air emissions resulting from the operation of this facility are discussed in Section 3.1.4.2. of this Final EIS.

Transmission Lines

Electric and Magnetic Fields

Electric and magnetic fields (EMF) are a natural occurrence produced by the earth itself. EMFs are also produced by any device which consumes or conducts electricity such as lights, televisions, appliances, radios, shavers, computers, wiring in houses and offices, as well as electrical transmission and distribution lines.

Both electric and magnetic alternating current fields induce currents in conducting objects, including people and animals. All of the electrical wiring in homes and offices, for example, emit EMF when the power is turned on.

Some scientists believe that exposure to these fields might be potentially harmful and that long-term exposure should be minimized. Hundreds of studies on electric and magnetic fields have been conducted in the United States and other countries. Studies of laboratory animals generally show that these fields have no obvious harmful effects, but subtle effects of unknown biological significance have been reported in some laboratory studies (Frey 1993).

Over the past decade, some attention has been focused on the suggestion in some research reports that workers in certain electrical occupations and people living close to power lines have an increased risk of leukemia and other cancers (Sagan 1991, National Radiological Protection Board 1992, Oak Ridge Associated Universities Panel 1992). However, the most recent scientific reviews conclude that the overall evidence is too weak to establish a cause-and-effect relationship between EMF and cancer (National Research Council 1996, National Institute of Environmental Health Sciences 1999).

The U.S./Canadian 230 kV transmission line is routed from the S2GF site along an existing railroad line, and then along a roadway to the U.S./Canadian border. This 230 kV would transmit at 1,570 amps. EMF levels associated with this transmission are estimated to be approximately 197 milligauss (mG) directly under the line, tapering off to approximately 21 mG at 100 feet perpendicular to the line, and 8 mG at 200 feet. There are a few homes in the area, however it is unlikely that any of them are close enough to experience any increase in EMF exposure from the new lines. The nearest building to the proposed line is about 200 feet away.

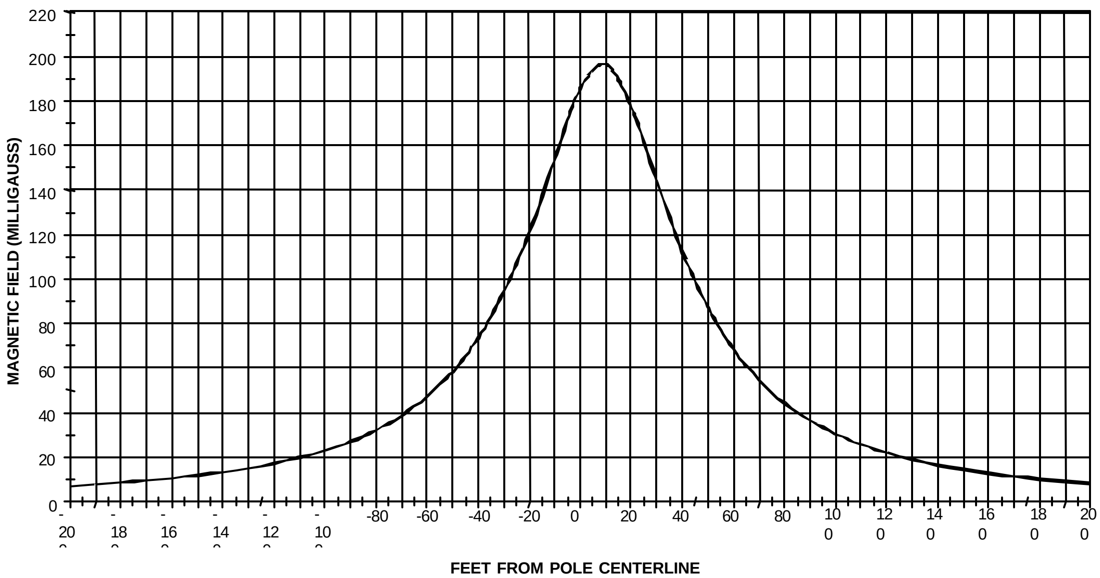
EMF levels are associated primarily with current and not line voltage. Line voltage plays a role in EMF only by determining the amount of current flowing on the line (for a given amount of megawatts generated, doubling the line voltage results in halving the line current) and by influencing the spacing between conductors (wires) of the three-phase circuit. The wire spacing generally increases as the voltage increases. Greater spacing between wires lowers the cancellation effect on EMF levels.

Figure 3.12-1 provides the calculated EMF profile for the 230 kV line.

Figure 3.12-1

S2GF/CANADIAN 230 KV LINE

(TRANSMISSION LOAD @ 1570 AMPS)



Health Effects of Transmission Lines

We are all exposed to varying levels of EMF. Concern regarding the possible health effects of exposure to EMF has led to extensive research. The human health research on EMF over the years has been primarily focused on whether or not a cause-and-effect association can be made between EMF and cancer, and whether there exists a biological mechanism by which EMF exposure can cause cancer. None of the proposed biological mechanisms has held up under additional testing, and the laboratory studies in living animals do not show that EMF can cause cancer. Following their evaluation of the body of scientific literature available through 1998, the National Institute of Environmental Health Sciences (NIEHS) concluded that the majority of the animal studies provide evidence that EMF fields do not cause cancer, or the promotion of cancer in exposed animals, and provide no basis to conclude that EMF affects cancer (NIEHS 1998).

The question of power lines and cancer arose because some epidemiology studies (that is, studies of disease occurrence in people) had reported a link with some kinds of cancer. This link is a statistical association, which in some studies indicated that more of the children who had cancer had lived closer to certain types of power lines, or were exposed to higher estimated magnetic fields (Savitz et al. 1988, Wertheimer et al. 1979, Feychting and Ahlbom 1993). However, because the meaning of these results was not clear, additional studies were undertaken. These studies did not show convincing evidence of links between EMF and childhood cancer (e.g., Linet et al. 1997, Preston Martin et al. 1996a, 1996b, Gurney et al. 1996, McBride et al. 1999, Kleinerman et al. 2000, UK Childhood Study Investigators 1999, Green et al. 1999a, 1999b). Studies of higher exposures that occur at workplaces have not found links with cancer overall, and have not shown strong, convincing links with any specific type of cancer (e.g., NIEHS 1998).

In recent years, the U.S. Government has focused its efforts on the EMF Research and Public Information Dissemination (RAPID) program, which has included a number of whole-animal research studies, and the 1998-1999 NIEHS evaluation of scientific research noted above. The NIEHS reviewed both epidemiologic and laboratory research related to cancer, as well as non-cancer endpoints. Both epidemiology and laboratory studies are relevant for assessing possible effects of exposure on human health. Laboratory studies of animals conducted as part of the NIEHS program and those published after the NIEHS report provide no basis to conclude that EMF affects cancer; animals exposed for long periods of time did not develop any more cancer than unexposed animals.

Using the approach of the National Toxicology Program, the NIEHS opinion is that EMF exposure at power frequencies would <u>not be listed</u> as a human carcinogen.

Undoubtedly, this subject will continue to be controversial because it is a recognized limitation of science that it is very difficult to prove the negative, that is, to prove that something is not there.

Electrical Shock

Power lines, like electrical wiring, can cause serious electric shocks if precautions are not taken in their design and construction. The project's proposed line would be designed and constructed in accordance with the National Electrical Safety Code (NESC). NESC specifies the minimum allowable distances between the lines and the ground or other objects. These requirements determine the minimum distance to the edge of ROW and the height of the line (i.e., the minimum required distance between the lines and houses, other buildings, and roadways, to reduce electric and magnetic field effects to acceptable levels).

People must also take precautions when performing work-related or leisure activities near power lines, to avoid possible electrocution through contact, such as installing television antennae or irrigation pipes too close to the lines.

Transmission lines can also induce voltages into objects near the lines. This effect can lead to nuisance shocks if a voltage is induced onto something like wire fencing installed on wood posts, and therefore insulated from the ground. However, this usually only becomes a problem with lines of voltages above 230 kV and is not anticipated to occur with the proposed transmission line. Should problems develop, simple grounding techniques can be used to eliminate the problem.

Natural Gas Pipeline

Natural gas pipelines are the only practical means of transporting and using natural gas. Pipelines are in use throughout the world. Various codes, regulations, and industry standards define how natural gas pipelines are designed and operated.

Ground movement/mass wasting is one of the biggest hazards to buried natural gas pipelines. The three most recent natural gas explosions in western Washington (Castle Rock, 1995; Everson, 1997; Kalama, 1997) appear to have been caused by ground movement on slopes. The ground along the proposed pipeline route is flat and stable, and there are no bridge crossings. The new pipeline would be constructed parallel to the existing pipeline that has been in place since 1992. The existing line has not experienced any damage from ground movement or mass wasting.

The route would be patrolled on a regular basis and checked by trained personnel (following a written qualification program required by 49 CFR Part 192) in order to anticipate potential problem areas early. The following events are typical of those to be investigated and reported:

- Any evidence of a gas leak (dying or dead vegetation, odor)
- Actual or threatened ground movement
- Flooding or unusual erosion of roads, banks, easements, or ROWs, including the investigation for possible stream migration and stream scour
- Subsidence or cracking of land and paved surfaces
- Construction, land leveling, or excavation work by others on or adjacent to the pipeline
- Required maintenance on company facilities, such as gates, fences, foot patrol roads, weed or brush removal
- Subdivision planning, surveying, or construction activity in the vicinity of the pipeline
- Missing or mutilated pipeline markers, or inadequately marked pipelines
- Evidence of gunshot damage or corrosion on exposed piping and components
- Evidence of vandalism
- Inoperative or damaged cathodic protection facilities

Regular natural gas leak surveys would be performed at intervals outlined in 49 CFR Part 192.706 and 192.723, by personnel walking the pipeline ROW directly above the pipeline, using appropriate natural gas instrumentation.

Any time there is evidence of a natural gas leak, the individuals conducting the patrol shall use a combustible gas indicator (CGI) to determine ambient gas concentrations in the soil and air, and shall immediately notify the S2GF plant engineer of the leak. The emergency response plan, as described in Section 7.2 of the ASC, would then be implemented. The plan is designed to address all types of emergencies that could occur at the plant or along the natural gas pipeline.

The aboveground natural gas pipeline facilities would be inspected weekly, monthly, and annually, and maintained according to the operation and maintenance plan to meet or exceed all regulatory requirements.

The probability of S2GF gas line failure is also minimized by reducing the opportunities for failure. Pipeline appurtenances are limited to the fenced valve station at the Canadian border and within the fenced areas of the plant site. The pipeline is buried in all other uncontrolled locations. Access to the border valve station is through farm fields so it is unlikely a runaway vehicle could crash the fencing and cause damage to the facility. Pedestrian access is available only to authorized personnel. Gas line appurtenances would be protected on the plant site, and offsite, by being contained within buildings or within immediate fenced areas. Bollards would be erected as required to ensure that onsite vehicles are not able to reach critical areas. Access to critical areas would be controlled by keyed entries and limited to authorized personnel.

The pipeline would be protected against corrosion by a sacrificial anode cathodic protection system. The system prevents corrosion by counteracting or preventing the electrolytic currents that cause corrosion. The pipeline would be coated with fusion-bonded epoxy or an equivalent watertight coating to minimize the possibility of corrosion occurring. The pipeline would also be inspected on a regular basis (every five years) using internal inspection devices commonly known as "smart pigs," to verify pipe wall thickness and integrity.

There is a slight risk of releasing natural gas into the environment during operation. Pressure control instrumentation would be used to keep the pipeline operating within specified pressure limits. Emergency relief valves with vent stacks would be installed to prevent the pressure in the line from rising above maximum allowable operating pressure. The relief valve would discharge to a safe point where the released natural gas would rapidly dissipate into the air. A gas system alarm would draw the plant operator's attention to the problem. Gas would not be released to the atmosphere from any other section of the pipe.

Safeguards regarding the design, construction, operation, and maintenance of the gas pipeline have been set forth in a partial settlement agreement between Washington Utilities and Transportation Commission and SE2 concerning natural gas pipeline issues (see Appendix G).

3.12.4 Environmental Impacts of No Action

There would be no environmental impacts to health and safety from the No Action Alternative.

3.12.5 Mitigation Measures

3.12.5.1 Construction

Line markers at 1,000-foot intervals are not likely to be visible by backhoe operators. The line should be marked so that any excavating equipment operator knows the location of the existing line.

No additional mitigation measures beyond those included as part of the construction plans have been identified.

3.12.5.2 Operation

A Spill Prevention, Control, and Countermeasure (SPCC) Plan would prepared by SE2, and approved by EFSEC, within six months after operation of the facility to show capability to handle any spills that might release oil upon waters of the United States. This plan must show compliance with federal rules governing such plans and be certified by a registered professional engineer.

As discussed in Section 3.8, S2GF needs to enter into or reiterate appropriate mutual aid agreements with the City local fire marshal and potentially with refineries at Cherry Point or in Canada to ensure adequate response in the event of a spill or fire/explosion involving the 2.5-million-gallon fuel tank.

3.12.6 Cumulative Impacts

The potential for exposure to hazardous fuel and non-fuel hazardous substances would increase. However, all necessary control measures would be taken to minimize the likelihood of an accidental release. Therefore, the cumulative impacts would be low.

Potential health related cumulative impacts resulting from the air emissions of this proposed project are discussed in Section 3.1.7 of this FEIS.

3.12.7 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts have been identified. Potential health related adverse impacts resulting from the air emissions of this proposed facility are presented in Section 3.1.8 of this FEIS.